

WHAT IS CLAIMED IS:

1. A method for producing detection statistics corresponding to information symbols comprising:

5 receiving a signal and creating data samples therefrom;  
correlating said data samples to a code to produce despread values;  
estimating a channel response to produce channel coefficient estimates;  
estimating impairment correlation among different delays of said  
received signal to produce impairment correlation estimates; and  
10 combining said despread values to produce a detection statistic using the  
channel coefficient estimates and the impairment correlation estimates.

2. The method of claim 1 wherein the step of estimating a channel response further comprises the step of:

15 correlating to a pilot channel to produce pilot channel despread values.

3. The method of claim 1 wherein the step of estimating a channel response further comprises the step of:

20 correlating to pilot symbols to produce pilot symbol despread values.

4. The method of claim 1 wherein the step of estimating a channel response includes receiving symbol values.

5. The method of claim 4 wherein the symbol values correspond to pilot  
25 symbol values.

6. The method of claim 4 wherein the symbol values correspond to detected symbol values.

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7. The method of claim 4 wherein the symbol values correspond to re-encoded symbol values.

8. The method of claim 1 wherein the step of estimating impairment correlation further comprises the step of:  
correlating to a pilot channel to produce pilot channel despread values.

9. The method of claim 1 wherein the step of estimating impairment correlation further comprises the step of:  
correlating to pilot symbols to produce pilot symbol despread values.

10. The method of claim 1 wherein the step of estimating impairment correlation further comprises the step of:  
receiving symbol values.

11. The method of claim 10 wherein the symbol values correspond to pilot symbol values.

12. The method of claim 10 wherein the symbol values correspond to detected symbol values.

13. The method of claim 10 wherein the symbol values correspond to re-encoded symbol values.

14. The method of claim 1 wherein the step of estimating impairment correlation among different delays further comprises the step of:  
receiving channel coefficient estimates.

15. The method of claim 1 wherein the step of combining despread values further comprises the steps of:

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combining said channel coefficient estimates and said impairment correlation estimates to produce weights; and

combining said weights and said despread values to produce said detection statistic.

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16. The method of claim 1 wherein said step of combining despread values further comprises the step of:

combining said despread values and said impairment correlation estimates to produce modified despread values; and

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combining said channel coefficient estimates and said modified despread values to produce a detection statistic.

17. The method of claim 1 wherein said despread values are combined with said impairment correlation estimates to produce whitened despread values.

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18. The method of claim 1 wherein said step of estimating impairment correlation among different delays further comprises the step of:

estimating elements of an inverse impairment correlation matrix.

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19. A spread spectrum receiver comprising:

means for receiving a signal and creating data samples therefrom;

means for correlating said data samples to a code to produce despread values;

means for estimating a channel response to produce channel coefficient

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estimates;

means for estimating impairment correlation among different delays of said received signal to produce impairment correlation estimates; and

means for combining said despread values to produce a detection statistic using the channel coefficient estimates and the impairment correlation estimates.

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20. The receiver of claim 19 wherein said means for estimating a channel response further comprises:

means for correlating to a pilot channel to produce pilot channel despread values.

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21. The receiver of claim 19 wherein the means for estimating a channel response further comprises:

means for correlating to pilot symbols to produce pilot symbol despread values.

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22. The receiver of claim 19 wherein the means for estimating a channel response further comprises means for receiving symbol values.

23. The receiver of claim 22 wherein the symbol values correspond to pilot symbol values.

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24. The receiver of claim 22 wherein the symbol values correspond to detected symbol values.

25. The receiver of claim 22 wherein the symbol values correspond to re-encoded symbol values.

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26. The receiver of claim 19 wherein the means for estimating impairment correlation further comprises:

means for correlating to a pilot channel to produce pilot channel despread values.

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27. The receiver of claim 19 wherein the means for estimating impairment correlation further comprises:

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means for correlating to pilot symbols to produce pilot symbol despread values.

28. The receiver of claim 19 wherein the means for estimating impairment correlation further comprises:  
5 means for receiving symbol values.

29. The receiver of claim 28 wherein the symbol values correspond to pilot symbol values.

30. The receiver of claim 28 wherein the symbol values correspond to detected symbol values.

31. The receiver of claim 28 wherein the symbol values correspond to re-  
15 encoded symbol values.

32. The receiver of claim 19 wherein the means for estimating impairment correlation among different delays further comprises:  
20 means for receiving channel coefficient estimates.

33. The receiver of claim 19 wherein the means for combining despread values further comprises:  
means for combining said channel coefficient estimates and said impairment correlation estimates to produce weights; and  
25 means for combining said weights and said despread values to produce said detection statistic.

34. The receiver of claim 19 wherein said means for combining despread values further comprises:

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means for combining said despread values and said impairment correlation estimates to produce modified despread values; and

means for combining said channel coefficient estimates and said modified despread values to produce a detection statistic.

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35. The receiver of claim 19 wherein said despread values are combined with said impairment correlation estimates to produce whitened despread values.

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36. The receiver of claim 19 wherein said means for estimating impairment correlation among different delays further comprises:

means for estimating elements of an inverse impairment correlation matrix.

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37. A method for estimating despreading delays comprising the steps of:  
producing sets of candidate delays;  
estimating channel responses to produce channel coefficient estimates corresponding to the sets of candidate delays;

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estimating impairment correlation among delays of the received signal corresponding to the candidate delays to produce impairment correlation estimates;  
combining the channel coefficient estimates and the impairment correlation estimates to produce metrics corresponding to the sets of candidate delays;  
and

producing estimates of despreading delays using the metrics.

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38. The method of claim 37, wherein said step of estimating channel responses further comprises the step of:

generating, as said channel coefficient estimates, values which correspond to: transmit filter response characteristics, medium response characteristics and receiver filter characteristics.

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39. The method of claim 37, wherein said step of estimating channel responses further comprises the step of:

improving said channel coefficient estimates using knowledge of at least one of transmit and receiver filter response characteristics.

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40. A receiver which uses estimated despreading delays to process a received signal comprising:

means for producing sets of candidate delays;

means for estimating channel responses to produce channel coefficient estimates corresponding to the sets of candidate delays;

means for estimating impairment correlation among delays of the received signal corresponding to the candidate delays to produce impairment correlation estimates;

means for combining the channel coefficient estimates and the impairment correlation estimates to produce metrics corresponding to the sets of candidate delays; and

means for producing estimates of despreading delays using the metrics.

41. The receiver of claim 40, wherein said means for estimating channel responses further comprises:

means for generating, as said channel coefficient estimates, values which correspond to: transmit filter response characteristics, medium response characteristics and receiver filter characteristics.

42. The receiver of claim 40, wherein said means for estimating channel responses further comprises:

means for improving said channel coefficient estimates using knowledge of at least one of transmit and receiver filter response characteristics.

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43. A method for despread a received signal comprising the steps of:  
storing a plurality of data samples;  
selectively processing the stored data samples by combining them with  
chip values; and  
5 summing the result to produce despread values.

44. The method of claim 43 wherein said step of selectively processing  
further comprises the step of:  
selectively combining said stored data samples with chip values during  
10 each sample period.

45. The method of claim 43, wherein said step of selectively processing  
further comprises the step of:  
selectively combining said stored data samples only for delays of  
15 interest.

46. A sliding correlator comprising:  
a delay line having a plurality of delay elements for delaying a stream of  
data samples input thereto;  
20 a plurality of remove chip units, each associated with an output of one of  
said plurality of delay elements, for removing chips from said delayed data samples;  
an adder for receiving outputs from said plurality of remove chip units  
and adding said outputs together; and  
an inhibit unit for selectively enabling at least one of said plurality of  
25 remove chip units and said adder.

47. The sliding correlator of claim 46, wherein said delay line is a circular  
buffer.



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48. The sliding correlator of claim 46, wherein said inhibit unit operates to enable said at least one of said plurality of remove chip units and said adder only for delays of interest.

5 49. The sliding correlator of claim 46, wherein said inhibit unit selectively enables and disables said plurality of remove chip units and said adder together.

50. The method of claim 1 wherein the step of receiving a signal further comprises the step of:

10 receiving a signal corresponding to a plurality of antenna signals.

51. The receiver of claim 19 wherein the means for receiving a signal further comprises:

15 means for receiving signals corresponding to a plurality of antenna signals.

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